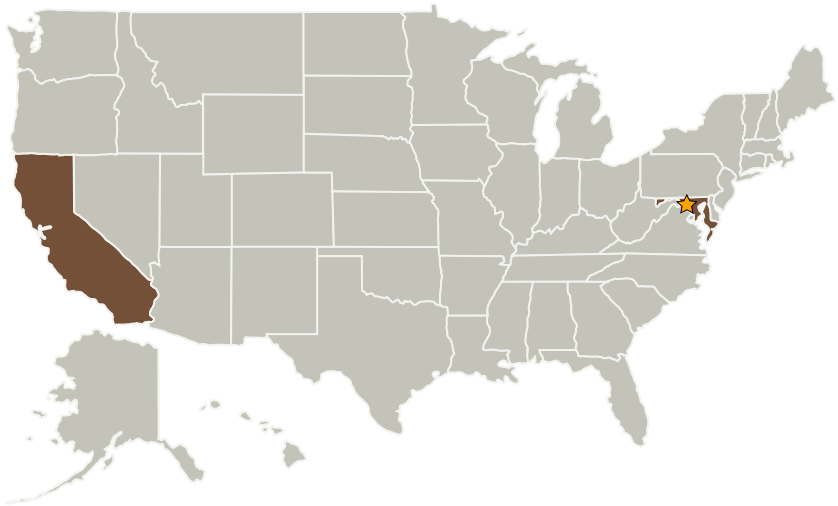
Fast Low Power ADC with Integrated Digital Data Processor, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

Innovative data measurement/acquisition systems are needed to support future Earth System Science measurements of the Earth's atmosphere and surface. An adequate system must employ a high-speed, extra low power, linear, analog-to-digital converter (ADC) with high input bandwidth and accuracy, followed by a digital signal processor that is usually implemented inside a field-programmable gate array (FPGA). Commercially available ADCs with input bandwidths larger than 1GHz feature high power consumption and latency, and poor linearity. With increasing ADC sampling rates, timing difficulties within the parallel interconnects between the ADC and the following FPGA become increasingly prominent. Therefore, a monolithic ADC incorporating a data converter that performs digital data demultiplexation and retiming is desired. To address these needs, the Advanced Science and Novel Technology Company proposes to develop a novel, extra low-power, extremely linear, under-sampling ADC featuring a high analog input bandwidth (>5GHz) that can easily interface to a following FPGA through a low-speed (<750Mb/s) parallel interface. To achieve this functionality, the proposed system-on-chip will utilize a proprietary sub-Nyquist front-end analog demultiplexer, a combinational ADC structure with proprietary gain-stabilization circuitry, and a digital signal processor implementing digital data demultiplexation and the company's proprietary data alignment scheme.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Advanced Science and Novel Technology	Supporting Organization	Industry	Rancho Palos Verdes, California

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.2 Avionics Systems and Subsystems
    - TX02.2.6 Data Acquisition Systems